

Reclamation Manual

Directives and Standards

Subject: Operating Practices and Procedures for High- and Significant-Hazard Dams (and other facilities, as applicable)

Purpose: To ensure that operating practices and procedures are uniformly applied Reclamation-wide for high- and significant-hazard dams (and for other facilities where specifically noted).

Authority: Reclamation Project Act of 1902 and Supplementary Acts; and Departmental Manual Part 753, Dam Safety Program.

Contact: Water Resources Office, D-5500

1. Standing Operating Procedures (SOP).

- A. **Requirements.** An SOP is required to be available for each high- and significant-hazard dam* upon transfer to Operation and Maintenance (O&M) status. Prior to transfer of the dam to operational status and initial filling of a reservoir, a draft copy of the SOP will be made available. The Regional Director will determine whether SOPs are needed for other dams and operating facilities.
- B. **Contents.** The SOP will include all applicable operating instructions to adequately, safely, and reliably operate the dam and its appurtenant structures and equipment. Recommended contents and format for the SOP are outlined within the *Standing Operating Procedures Guide for Dams, Reservoirs, and Power Facilities*, available from the Technical Service Center (TSC), Attention: D-8470.
- C. **Issuance.** All copies of the SOP for official use will be issued by the regional office or the authorized operating office (i.e., area office) and kept current. The initial letter of transmittal will be dated and signed by the Regional Director (or assigned designee) to show that the SOP has been established as an official document. This letter will be retained in the SOP. Letters transmitting SOP revisions will not replace the initial letter of transmittal unless a completely new SOP is to be issued.
 - (1) A record of the complete distribution list will be kept in the SOP by including the Letter of Transmittal, showing the complete distribution list (see the example below), and supplying a control number for each copy to each office. This will ensure that revised pages are furnished to all copyholders whenever revised instructions are distributed.

* High- and significant-hazard dams are defined as those dams presently classified under Reclamation's Safety Evaluation of Existing Dams (SEED) Program, where partial or complete failure of the dam results in the release of floodwaters which have the potential to cause loss of life or significant property, natural resource, or cultural resource damage downstream of the dam.

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- (2) All SOP supporting documents will be listed or otherwise identified in the SOP.

D. **Distribution.** The regional office, unless delegated to the area office, has the responsibility for publishing and distributing official SOP's and related supporting documents. Distribution of official copies of the SOP will be restricted to offices having operational responsibilities for the facility as determined by the Regional Director. In addition, official copies will also be distributed to the following:

- (1) At least one copy of the SOP will be made available at the damsite or power facility and kept in a secure and readily accessible location for use by operating personnel.
- (2) Two copies of the SOP are to be furnished to the Inspections and Emergency Management Group, Attention: D-8470, TSC.
- (3) If the SOP contains information on a Reclamation-operated power facility, one copy of the SOP is to be furnished to the Hydroelectric Research and Technical Services Group, Attention: D-8450, TSC.

Example - SOP Official Distribution List

Location ¹	Number of SOP copies	Other supporting documents transmitted with the SOP ²	SOP copy control No.
Office at dam	1		
Water-user office	1		
Reclamation Field Office			
Reclamation Area Office			
Regional Office			
Technical Service Center, Denver CO			
Inspections and Emergency Mgmt. Group (D-8470)	2		

¹Give precise office name.

²Specifically name each document (e.g., Reservoir Regulation Manual, Water Control Manual, etc.)

E. Reviews/Revisions.

- (1) The SOP will be kept current by reviewing and revising the document (if revisions are significant) at least annually. Reviews are to be made by key operating personnel at the dam and/or powerplant, the field office, the area office, and the regional office, as necessary, to ensure that instructions are adequate.

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- (2) The Area Manager is responsible for ensuring the SOP is current. The Area Manager is to be made aware of significant revisions, particularly those which are drafted and transmitted by the area office to the regional office. Any changes made by the regional office to the draft revisions will be communicated back to the Area Manager or assigned staff.
 - (3) Revisions to the SOP will be transmitted to all official copy holders. The letter transmitting the revised pages of the SOP will be signed by the Regional Director (or assigned designee) or as delegated to the Area Manager, in consultation with the Regional Director, to indicate official approval of the changes. An SOP Revision Sheet will accompany the letter and a revision date and revision number will be noted at the bottom of each revised page, to ensure the latest revision has been filed. The old revision sheet will be **discarded**, if the new revision sheet shows **all** previous revisions.
- F. **Deviations.** Operating procedures as stated in the SOP are to be strictly adhered to. If the need arises to deviate from the instructions stated in the SOP, deviations will be pre-approved by the responsible office.
- G. **Outside Requests.** If requests for SOPs or other operating documents are received from the general public [including Freedom of Information Act (FOIA) requests], or other Federal, State, or local agencies, only certain portions of these documents will be provided. Areas/sections to be removed from the operating documents prior to fulfilling such requests include:
- (1) Critical operating information related to equipment at the dam or powerplant (including equipment operating procedures and related drawings). (Pursuant to exemption 2 of the FOIA.)
 - (2) Information related to access of operating areas of the dam or powerplant (including procedures, locations, and drawings). (Pursuant to exemption 2 of the FOIA.)
 - (3) Communication information related to personal or restricted use telephone numbers, including that contained within an Emergency Action Plan. (Pursuant to exemption 6 of the FOIA.)
 - (4) Operational drawings, designs, computer source code, communication/control procedures and protocols, along with other information related to the supervised remote control of dam, powerplant, and waterway systems. (Pursuant to exemption 2 of the FOIA.)

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2. Dam Operators Training/Proficiency Review and Validation.

A. Requirements.

- (1) As a minimum, two personnel at each dam are required to have the following outlined training, one as the primary dam operator and one as the designated alternate. In some cases, it will be necessary to include more than two personnel to adequately provide primary and backup coverage on the duties as outlined later for each of the onsite training requirements.
- (2) All new dam operators (and new designated alternates) are required to receive **onsite** dam operators training prior to being on duty at the damsite. Additionally, new operators and alternates are to attend the next available **classroom** training session.
- (3) All dam operators (and the designated alternates) are required to receive both refresher classroom and onsite training periodically, which will form the basis of a “proficiency review” program to validate their knowledge and abilities related to expected duties and responsibilities. The only exceptions to this requirement are the following:
 - (a) Control room operators for powerplants where adequate technical personnel are available to assist in operation, maintenance, and safety of dams activities as determined by the Area Manager.
 - (b) Dam operators employed by water districts that manage several high- and significant-hazard dams and have their own “proficiency review” program for dam operators, which is determined adequate by the Area Manager.

B. Frequency. Each dam operator (and the designated alternates) is required to regularly attend:

- (1) Classroom training no less than every 3 years, **and**
- (2) Onsite training no less than every 6 years, unless more frequent training is needed because of operational complexities of the dam, dam operator proficiency, changes in mechanical equipment, instrumentation, following a Safety of Dams modification, etc. Determination of the appropriate frequency of onsite training (maximum frequency of 6 years) will be the responsibility of the regional or area office staff conducting the onsite training.

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- C. **Responsibility.** The Regional Director, or as delegated to the Area Manager, is responsible for scheduling and providing both classroom and onsite dam operators training sessions, to meet the requirements of this directive.
- D. **Training Instructors.** The instructors for providing both the classroom and onsite training are to be experienced and have a thorough knowledge of the principles, practices, and procedures related to the operation, maintenance, and safety of a dam.
- E. **Content of Classroom Training.** Because classroom training may be conducted for groups of dam operators (and the designated alternates) representing different facilities, the training will generally present a more generic discussion of the subject material. Classroom training is to accomplish the goal of providing the participants with a fundamental knowledge of the full range of operations required for dams of all sizes. As a minimum, the classroom training will cover the following topics:
- (1) Purposes of Reclamation projects (and how the dams interrelate).
 - (2) Design and construction of safe dams.
 - (3) Awareness of dam failures and incidents.
 - (4) Instrumentation (purposes, types, locations, readings, and maintenance requirements).
 - (5) Dam tender/operator duties and responsibilities.
 - (6) Emergency management.
 - (7) Documentation (operating and reference).
 - (a) SOP, Emergency Action Plan (EAP), Designers' Operating Criteria.
 - (b) Reference material and supporting documents.
 - (c) Manufacturers' instructions.
 - (d) Operating log.
 - (8) Facility reviews/site examinations.
 - (9) Hydrology and reservoir operations.

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- F. **Content of Onsite Training.** Onsite training will be conducted for dam operators (and the designated alternates) at their respective facility and will consist of a minimum of 4 hours of onsite instruction and discussion. Less than the minimum of 4 hours will be allowed, as an exception, at the discretion of the Area Manager, for a facility which is small and associated operations are considered simple. The goal of onsite training is to provide participants with specific knowledge of dam operations relative to their unique facility. As a minimum, the onsite training will cover the following topics specific to each facility:
- (1) SOP and other site-specific operating and reference documents.
 - (2) Reservoir operating procedures.
 - (3) EAP and emergency management responsibilities.
 - (4) Operations related to major control gates/valves and other associated mechanical equipment.
 - (5) Instrumentation purposes, locations, reading requirements and gathering, and maintenance.
 - (6) Operating log.
 - (7) Performance parameter technical memorandum (TM) and potential critical failure modes.
 - (8) Maintenance management system and related documentation needs.
 - (9) Personnel safety procedures.
 - (10) Communication, attendance, and access factors related to operations.
 - (11) Other specific duties and responsibilities related to the dam.
- G. **Guidance.** General guidance in providing classroom training can be found in the *Training for Dam Operators Instructors Manual*, available from the TSC, Attention: D-8470. Information on conducting onsite training is provided within the *Guidelines for Onsite Dam Operator Training*.

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H. Proficiency Review/Validation.

- (1) Validation of each dam operator's (and the designated alternate's) knowledge and proficiencies related to their expected duties and responsibilities will be documented on the standard Reclamation form, Form 7-2533 (appendix A). **At the time of the onsite training**, the form will be signed and dated by both the dam operator (or the designated alternates) and the principal onsite instructor to verify the completion of the onsite training and note the attendance (dates/locations) of the latest two classroom training sessions. A separate form is to be completed for each individual being trained/reviewed. Copies of the form will be provided and maintained in either the area or the regional office.
- (2) The standard form (appendix A) provides for documentation of any needed improvements in the proficiency of the dam operator (or the designated alternate) resulting from the onsite training. Timely efforts will be made by appropriate regional or area office personnel to assist the dam operators in addressing these needs and bringing the dam operator (or the designated alternate) to an acceptable proficiency level. To record these efforts, another completed form or other documentation is to be provided to indicate the improvement of the areas cited on the initially completed form.

3. Operating Log (Logbook).

- A. **Requirements.** A bound operating log or logbook will be maintained at each high- and significant-hazard dam. Previously completed logbooks will be kept in a secure and dry location that will allow for ready reference by the dam operating personnel (or by Reclamation). At part-time attended facilities, records will be kept for the period of attended operation. At unattended facilities, records will cover each visit made to the facility. A permanent logged record (paper or electronic) will be maintained by either the operating official (dam operator) or the designated alternate on duty.
- B. **Content.** The log will contain chronological entries of all important events to provide a continuing record of operating activities for future reference. Entries in the operating log will include the documentation of the following activities, as a minimum:
 - (1) Normal and emergency modes of operation of outlet works and/or spillways including individual gate position changes (unless recorded on another database).
 - (2) Water elevations and discharges (unless reported on water supply forms or approved daily record).
 - (3) Startup and stopping of mechanical equipment.

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- (4) Test of standby equipment or gate controls.
- (5) Test and exercise of outlet and spillway control devices (gates and valves).
- (6) Minor and major maintenance activities, including scheduled maintenance.
- (7) Reservoir surveillance.
- (8) Initial acknowledgment of an emergency or unusual conditions.
- (9) Acts of vandalism or other security incidents.
- (10) Request and concurrence to change from normal operation during an emergency or unusual conditions.
- (11) Communications network checks and emergency exercises conducted.
- (12) Record of names, addresses, and purposes of visitors.
- (13) Acknowledgment of SOP/EAP review by operating personnel and supervisor (in the case of a water user-operated dam, Reclamation may acknowledge as the supervisor).
- (14) Verification of annual site inspections, facility reviews, and special examinations.
- (15) Documentation of receipt of dam operators training (onsite and/or classroom).
- (16) Miscellaneous items pertinent to operation, emergency, or unusual conditions at the structures.

On larger facilities, some of the above items may be recorded through other means.

- C. **Operating Log (Logbook) Entries.** All entries in the bound operating log will be made legibly in ink, dated, and signed. Neither erasures nor ink eradicators are to be used to make the corrections. Errors are to be lined out lightly, so that the incorrect notation is still legible after the correct entry is made. If electronic logs are used, they are to be password protected or other appropriate actions taken to prevent loss or alteration of past records.
- D. **Forms.** "Water Supply Forms" and form 7-1792, Telephone Report of Water and Power Interruptions and Facility Failure (emergency or unusual conditions) or other approved daily record, where needed, will be considered part of the operating

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personnel's operating log. They will be available at all times. A listing of these additional forms will be recorded in the front of the operating log.

4. General Operating Practices.

A. Outlet Works Gate Exercising.

- (1) Each gate or valve that releases reservoir water through an outlet works, including those designated as emergency (guard) and regulating gates or valves, will be exercised through a complete opening and closing cycle at least annually under a balanced-head condition or with the outlet works dewatered.
- (2) Unbalanced-head (flow) condition exercising of emergency (guard) gates and valves is to be performed on a 6-year frequency. All scheduling of unbalanced-head (flow) condition exercising of emergency (guard) gates will be coordinated with area office personnel prior to being performed.
- (3) All gate and valve exercising operations will be documented in the operating log or other appropriate means to serve as a permanent record for reference purposes. A copy of data related to unbalanced-head exercising of emergency (guard) gates and valves will be sent to the TSC, Attention: D-8450, for inclusion in a Reclamation-wide database for gate and valve tests. A listing of recommended data to be obtained is available, upon request, from the TSC, Attention: D-8450.
- (4) Any site-specific variances from these exercise requirements will be reflected and documented in the SOP for the facility. Guidance on gate and valve exercising is also outlined within the *Standing Operating Procedures Guide for Dams, Reservoirs, and Power Facilities*. Exercise requirements are also to include the use of emergency or backup power sources.

B. Spillway Gate Exercising.

- (1) Spillway gates will be exercised annually to confirm that the gates will open and close satisfactorily.
- (2) All gate exercising operations will be documented in the operating log or other appropriate means to serve as a permanent record for reference purposes.
- (3) Any site-specific variances from these exercise requirements will be reflected and documented in the SOP for the facility; however, such variances will be subject to appropriate processes outlined in *Decisions Related to Dam Safety Issues* (Reclamation Manual FAC P02) prior to documentation within the SOP.

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Guidance on gate and valve exercising is also outlined within the *Standing Operating Procedures Guide for Dams, Reservoirs, and Power Facilities*.

Exercise requirements are also to include the use of emergency or backup power sources.

- C. **Safety Procedures.** All Reclamation operating procedures will incorporate measures which fulfill the provisions of the most current publication of *Reclamation Safety and Health Standards*.
- (1) When Reclamation projects are not operated by Reclamation, the operating entity is subject to either Federal or State occupational safety and health requirements, or more stringent standards, if specified by contract with Reclamation.
 - (2) When safety and health standards require compliance with multiple and comprehensive safety and health program elements, procedures will be established which will allow efficient accomplishment of the operations. Examples of operations which may require this degree of attention would include, but is not limited to: entry into confined spaces; rope-supported work; and operations requiring hazardous energy.
- D. **Temporary Reservoir Surcharge.** Authorization for temporary surcharge storage requires the concurrence of the responsible Regional Director. Scheduled reservoir surcharge situations require advance authorization from the responsible Regional Director.
- E. **Maintenance Management System.** A documented maintenance management system will be established at each dam to track all pertinent maintenance and inspection operations scheduled and accomplished at the facility.
- F. **Reservoir Capacity Allocations.** Up-to-date files of Reservoir Capacity Allocations (RCA) sheets (Form 7-1686) will be approved and maintained for all reservoirs in which Reclamation has a demonstrated responsibility by reason of its involvement in the design, construction, operation, or ownership of the dam or appurtenant facilities. Initiation of updating the RCA sheets will be made by the area office. The RCA sheets will be approved and distributed by the Regional Director, with a copy of the approved RCA sheet included in the SOP. However, prior to approval and distribution of an updated RCA sheet, where changes in reservoir storage levels or operations have a potential effect on dam safety, such actions will be subject to appropriate processes outlined in *Decisions Related to Dam Safety Issues* (Reclamation Manual FAC P02). General guidance in preparing RCA sheets can be found in the *Standing Operating Procedures Guide for Dams, Reservoirs, and Power Facilities*, available from the TSC, Attention: D-8470.